

## REMARKS

Claims 1-20 are pending in the present application. In the Office Action mailed May 5, 2006, the Examiner took the following action: rejected claims 1-20 under 35 U.S.C. §103(a) as being unpatentable by Saukaitis (U.S. 2,941,949) in view of Gulla (U.S. 3,551,122) and in further view of Toprac (U.S. 6,379,980). Applicants respectfully request reconsideration of the application in view of the foregoing amendments and the following remarks.

### *I. Rejections under 35 U.S.C. §103(a)*

Claims 1-20 are rejected under 35 U.S.C. §103(a) as being rendered obvious by Saukaitis in view of Gulla in further view of Toprac. Respectfully, applicants traverse the rejections, and submit the claims are allowable over the references cited for the reasons explained in detail below.

#### Saukaitis (U.S. 2,914,949)

Saukaitis teaches the addition of small amounts of triphenyl sulfonium chloride to an acid cleaning or pickling solution used for removing scale or oxides from metal surfaces. (1:25-29). The triphenyl sulfonium chloride substantially prevents or retards the attack of the acid on the basis metal without interfering with the removal of scale or oxide from the surface. (1:30-35). Significantly, Saukaitis repeatedly and emphatically stresses that the primary purpose of his invention is to retard or prevent the cleaning solution from attacking (*i.e.* etching) the basis metal. (1:33-35; 2:1; 2:23-24).

#### Toprac (U.S. 6,379,980)

Toprac teaches a method for monitoring the performance of a material removal tool. (2:32-33). The method includes measuring the thick of a silicone wafer process layer, removing a

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portion of the process layer, determining the removal rate, and comparing the determined removal rate with the expected rate to monitor the performance of the material removal tool. (2:35-42).

Gulla (U.S. 3,551,122)

Gulla teaches a process for finishing aluminum that is characterized by dissolving aluminum from the surface of the alloy leaving silicone and other insoluble alloying metals behind as a visible adherent coating resistant to oxidation and highly receptive to finishing operations such as plating and painting. (1:12-19).

Claim 1-9

Claim 1 recites a process for combined chemically cleaning and etching parts made of aluminum and/or aluminum alloys comprising: (a) providing a cleaning and etching solution comprising: (1) 5-35 grams/liter of phosphoric acid; (2) 5-35 grams/liter of hydrogen fluoride; (3) 55-95 grams/liter of sulfamic acid; (4) 55-95 grams/liter of glycol ether; and (5) balance water; (b) contacting said parts with said solution for a time sufficient to achieve the desired amount of cleaning and etching; (c) periodically measuring the etching rate of said solution to determine if the etching rate is at or above the required minimum rate; (d) when the etching rate is below the required minimum rate, adding sufficient hydrogen fluoride to restore the etching rate above the required minimum rate; and (e) periodically adding sufficient sulfamic acid to prevent the formation of scale made of hydrated aluminum fluoride.

Applicants respectfully assert that claim 1 is patentable over the cited references (Saukaitis, Gulla, and Toprac) for at least two reasons. First, each of the references cited to Saukaitis, Gulla and Toprac does not disclose, teach or fairly suggest a process for combined chemical cleaning and *etching* parts made of aluminum and/or aluminum alloys comprising: (d)

*when the etching rate is below the required minimum rate, adding sufficient hydrogen fluoride to restore the etching rate above the required minimum rate.* (emphasis added).

In contrast, Saukaitis merely teaches the use of acid baths for cleaning and pickling of metal parts, it does not teach controlling a process for the *etching* of metal. In fact, Saukaitis repeatedly and emphatically stresses that the primary purpose of his invention is to retard or prevent etching of the basis metal. (1:33-35; 2:1; 2:23-24).

Saukaitis states, “...the cleaning and pickling of the metal mentioned is commonly effected by means of acid baths which remove scale or oxides from the surface and the principle object of my invention is to provide improved baths for this purpose.” (1:20-25). Pickling, as used in the metallurgical science, means, “The process of chemically removing oxides and scale from the surface of a metal by the action of water solutions of inorganic acids.” *Principal Metals Glossary*, <http://www.principalmetals.com/glossary/pdoc.htm>.

Moreover, Saukaitis actually teaches away from the intentional etching of metals. Saukaitis further states, “My invention resides in the discovery that the addition of a small amount triphenyl sulfonium chloride to an acid cleaning or pickling solution...*substantially prevents or retards the attack of the acid on the basis metal* without interfering with the removal of scale or oxide from the surface.” (1:30-35). (emphasis added). Therefore, since the purpose of Saukaitis is to *prevent etching* of the base metal, it cannot properly be cited as teaching a process for combined chemical cleaning and *etching* parts made of aluminum and/or aluminum alloys, as recited in claim 1, comprising: (d) *when the etching rate is below the required minimum rate, adding sufficient hydrogen fluoride to restore the etching rate above the required minimum rate.* (emphasis added).

Similarly, Gulla also teaches away from a process comprising the periodic addition of hydrogen fluoride to restore the etching rate, as recited in claim 1. Specifically, Gulla teaches that the “activator solution” for the process of forming its silicon conversion coating requires “a

halide ion *other than the fluoride ion.*" (2:57-61). This is because Gulla teaches that "fluoride ions attach and dissolve silicon whereas the attack of other halide ions on silicon is minimal." (5:21-25). Thus, since Gulla specifically teaches away from the use of fluoride ions, it cannot properly be cited as teaching a process for combined chemical cleaning and etching parts made of aluminum and/or aluminum alloys comprising: (d) when the etching rate is below the required minimum rate, adding sufficient *hydrogen fluoride* to restore the etching rate above the required minimum rate. (emphasis added). Moreover, since Toprac merely teaches a method for monitoring the performance of a material removal tool, it does not remedy the deficiencies of Saukaitis and Gulla.

Second, each of the references cited to Saukaitis, Gulla and Toprac does not disclose, teach or fairly suggest a process for combined chemical cleaning and *etching* parts made of aluminum and/or aluminum alloys comprising: (e) *periodically adding sufficient sulfamic acid to prevent the formation of scale made of hydrated aluminum fluoride.* (emphasis added). Saukaitis teaches the use of acid baths to clean and pickle oxidation and scale from metal parts. However, it does not teach the *prevention* of the formation of scale, let alone specifically hydrated aluminum fluoride scale, by the addition of sulfamic acid.

Furthermore, Gulla only teaches cleaning excessive deposits of its silicon conversion layer, or smut, on the base metal using hydrofluoric and nitric acids. However, Gulla does not teach the *prevention* of the formation of undesirable scale, specifically hydrated aluminum fluoride scale, by the use of sulfamic acid.

Lastly, since Toprac merely teaches a method for monitoring the performance of a material removal tool, it also does not disclose, teach or fairly suggest a process for combined chemical cleaning and etching parts made of aluminum and/or aluminum alloys comprising: (e) *periodically adding sufficient sulfamic acid to prevent the formation of scale made of hydrated aluminum fluoride.* (emphasis added).

Accordingly, applicants respectfully submit each of the cited references (Saukaitis, Gulla, and Toprac), whether individually, or in combination, does not disclose, teach or fairly suggest every aspect of the process recited in claim 1. Thus, claim 1 is allowable over the cited references. Furthermore, since claims 2-9 depend from claim 1, they are also allowable over the cited references for the same reason claim 1 is allowable, as well as for additional limitations recited in those claims.

#### Claim 10-18

Claim 10 recites a process for combined chemically cleaning and etching parts made of aluminum and/or aluminum alloys comprising: (a) providing a cleaning and etching solution comprising: (1) 5-35 grams/liter of phosphoric acid; (2) 5-35 grams/liter of hydrogen fluoride; (3) 120-220 grams/liter of sulfamic acid; (4) 55-95 grams/liter of glycol ether; and (5) balance water; (b) contacting said parts with said solution for a time sufficient to achieve the desired amount of cleaning and etching; (c) periodically measuring the etching rate of said solution to determine if the etching rate is at or above the required minimum rate; (d) when the etching rate is below the required minimum rate, adding sufficient hydrogen fluoride to restore the etching rate above the required minimum rate; and (e) periodically adding sufficient sulfamic acid to prevent the formation of scale made of hydrated aluminum fluoride.

Applicants respectfully assert that claim 10 is patentable over the references cited (Saukaitis, Gulla, and Toprac) for at least two reasons. First, as discussed above, each of the references cited to Saukaitis, Gulla and Toprac does not disclose, teach or fairly suggest a process for combined chemical cleaning and *etching* parts made of aluminum and/or aluminum alloys comprising: (d) *when the etching rate is below the required minimum rate, adding sufficient hydrogen fluoride to restore the etching rate above the required minimum rate.* (emphasis added).

Second, as further discussed above, each of the references cited to Saukaitis, Gulla and Toprac does not disclose, teach or fairly suggest a process for combined chemical cleaning and *etching* parts made of aluminum and/or aluminum alloys comprising: (e) *periodically adding sufficient sulfamic acid to prevent the formation of scale made of hydrated aluminum fluoride*. (emphasis added).

Accordingly, applicants respectfully submit each of the cited references (Saukaitis, Gulla, and Toprac), whether individually, or in combination, does not disclose, teach or fairly suggest every aspect of the process recited in claim 10. Thus, claim 10 is allowable over the cited references. Furthermore, since claims 11-18 depend from claim 10, they are also allowable over the cited references for the same reason claim 10 is allowable, as well as for additional limitations recited in those claims.

#### Claim 19-20

Claim 19, as amended, recites a process for combined chemically cleaning and etching parts made of aluminum and/or aluminum alloys comprising: (a) providing a cleaning and etching solution comprising: (1) 25-35 grams/liter of phosphoric acid; (2) 25-35 grams/liter of hydrogen fluoride; (3) 120-130 grams/liter of sulfamic acid; (4) 80-95 grams/liter of propylene glycol monomethyl ether; and (5) balance water; (b) contacting said parts with said solution for a time sufficient to achieve the desired amount of cleaning and etching; (c) periodically measuring the etching rate of said solution to determine if the etching rate is at or above the required minimum rate; (d) when the etching rate is below the required minimum rate, adding 0.5-1.3 grams of hydrogen fluoride; and (e) periodically adding 7-28 grams per liter of sulfamic acid.

Applicants respectfully assert that claim 19, as amended, is patentable over the references cited (Saukaitis, Gulla, and Toprac) for at least two reasons. First, each of the references cited to Saukaitis, Gulla and Toprac does not disclose, teach or fairly suggest a process for combined

chemical cleaning and etching parts made of aluminum and/or aluminum alloys comprising: (d) *when the etching rate is below the required minimum rate, adding 0.5-1.3 grams of hydrogen fluoride.* (emphasis added).

As stated above, Saukaitas teaches the use of acid baths solely for cleaning and pickling metal, so it cannot teach the addition of a specific amount of an acid, such as hydrogen fluoride, to maintaining a minimum *etching* rate. Gulla specifically teaches away from the use of fluoride ions, so it cannot teach the use of *hydrogen fluoride* to dissolve or etch metal. Furthermore, Toprac does not remedy the deficiencies in the teachings of Saukaitas and Gulla because it only teaches monitoring the performance of a material removal tool.

Second, each of the references cited to Saukaitis, Gulla and Toprac does not disclose, teach or fairly suggest a process for combined chemical cleaning and *etching* parts made of aluminum and/or aluminum alloys comprising: (d) *periodically adding 7-28 grams per liter of sulfamic acid to prevent the formation of scale made of hydrated aluminum fluoride.* (emphasis added).

As stated above, Saukaitas teaches the use of acid baths for the cleaning and pickling of oxide and scale from metal parts. However, it does not disclose, teach or fairly suggest the periodic addition of acids, such as sulfamic acid recited in claim 19, to *prevent* the formation of scale made of hydrated aluminum fluoride. Likewise, Gulla teaches the use of acid to remove excessive silicon conversion layer buildup. However, Gulla also does not disclose, teach, or fairly suggest the period addition of sulfamic acid to *prevent* hydrated aluminum fluoride formation. Lastly, Toprac does not remedy the deficiencies in the teachings of Saukaitas and Gulla because it only teaches monitoring the performance of a material removal tool.

Accordingly, applicants respectfully submit each of the cited references (Saukaitis, Gulla, and Toprac), whether individually, or in combination, does not disclose, teach or fairly suggest every aspect of the process recited in claim 19. Thus, claim 19 is allowable over the cited

references. Furthermore, since claims 20 depends from claim 19, it is also allowable over the cited references for the same reason that claim 19 is allowable, as well as for the additional limitation recited.

### CONCLUSION

Applicants respectfully submit pending claims 1-20 are now in condition for allowance. If there are any remaining matters that may be handled by telephone conference, the Examiner is kindly invited to contact the undersigned attorney at the telephone number listed below.

Respectfully Submitted,

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